

**CLAIMS**

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1. A passive optical network arrangement comprising:  
a head-end station;  
at least one subscriber station;  
5 a passive optical network providing optical connectivity from each of said stations to each other station;  
wherein said subscriber stations are arranged to transmit on a common optical frequency distinct from that on which said head-end station is arranged to transmit, and each of said subscriber stations is arranged to detect when another  
10 of said subscriber stations is transmitting on said common optical frequency over said passive optical network.
2. A passive optical network arrangement according to claim 1 in which the subscriber station communicates with the head-end station using a carrier sense/collision detection protocol.
- 15 3. A passive optical network arrangement according to claim 2 in which the protocol is an Ethernet protocol.
4. A passive optical network arrangement according to claim 2 in which the protocol operates at bit rates of the order of 1Gbit/s or above.
- 20 5. A passive optical network arrangement according to claim 1 in which the passive optical network provides optical connectivity from each of said stations back to itself.
6. A passive optical network arrangement according to claim 1 in which said passive optical network comprises:  
a passive star coupler connected by means of point-to-point optical  
25 links to each of the stations.
7. A passive optical network arrangement according to claim 1 in which the passive optical network provides no optical connectivity from each of said stations back to itself.

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10. An optical transceiver arrangement comprising:

a transmission detector arranged to receive, on said first optical frequency, signals from a network indicative of a transmission by another subscriber station on said first frequency;

a medium access logic unit arranged to prevent transmission on said first frequency while said transmission detector is detecting said signals from a network indicative of a transmission by another subscriber station on said first frequency .

~~11. An optical transceiver arrangement according to claim 10 in which the transceiver further comprises:~~

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an optical frequency splitter arranged to provide said signal on said first frequency to said transmission detector and said signal on said second frequency to said receiver.

13. An optical transceiver arrangement according to claim 12 in which the station comprises, said indication comprises any non-zero signal on said first optical frequency.

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15. An optical transceiver arrangement according to claim 14 in which the light detector comprises a PIN diode.

16. A communications network comprising an optical transceiver according to claim 10.

17. A method of operating a passive optical network arrangement comprising:

- 5                   a head-end station;
- at least one subscriber station;
- a passive optical network providing optical connectivity from each of said stations to each other station;
- comprising the steps of:

10                   at least one of the subscriber station transmitting on an optical frequency common to the subscriber stations and distinct from that on which said head-end station is arranged to transmit;

                  at least one of the subscriber stations detecting when another of said subscriber stations is transmitting on said common optical frequency over said passive optical network.

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18. A method of operating an optical transceiver arrangement comprising:

transmitting data on a first optical frequency;

receiving, on said first optical frequency, signals from a network indicative of a transmission by another subscriber station on said first frequency;

20                   preventing transmission on said first frequency while said transmission detector is detecting said signals from a network indicative of a transmission by another subscriber station on said first frequency .

19. A passive optical network arrangement according to Claim 7 in which the passive optical network comprises a passive optical coupler comprising:

25                   a plurality of input and output port pairs;

and arranged to couple each of said input ports to the output port of each other input and output port pair.

20. A passive optical network arrangement according to Claim 19 in which the passive optical coupler comprises:

wherein each input port is coupled to all output ports other than its corresponding output port.

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